



BSI Standards Publication

**Buildings and civil engineering
works — Sealants —
Determination of changes
in cohesion and appearance
of elastic weatherproofing
sealants after exposure of
statically cured specimens
to artificial weathering and
mechanical cycling**

National foreword

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Buildings and civil engineering works — Sealants — Determination of changes in cohesion and appearance of elastic weatherproofing sealants after exposure of statically cured specimens to artificial weathering and mechanical cycling

*Bâtiments et ouvrages de génie civil — Mastics — Détermination des
variations de cohésion et apparence des mastics élastiques résistants
aux intempéries après exposition d'éprouvettes statiquement
polymérisées à un cycle mécanique et de vieillissement artificiel*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 59, *Buildings and civil engineering works*, Subcommittee SC 8, *Sealants*.

Buildings and civil engineering works — Sealants — Determination of changes in cohesion and appearance of elastic weatherproofing sealants after exposure of statically cured specimens to artificial weathering and mechanical cycling

1 Scope

This International Standard specifies laboratory exposure procedures for determining the effects of cyclic movement and artificial weathering on cured, elastic weatherproofing joint sealants (one- or multi-component).

2 Normative reference

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4628-4:2003, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 4: Assessment of degree of cracking*

ISO 4892-1:1999, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance*

ISO 4892-2:2013, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 4892-3:2013, *Plastics — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps*

ISO 4892-4:2013, *Plastics — Methods of exposure to laboratory light sources — Part 4: Open-flame carbon-arc lamps*

ISO 6927:2012, *Buildings and civil engineering works — Sealants — Vocabulary*

ISO 8339:2005, *Building construction — Sealants — Determination of tensile properties (Extension to break)*

ISO 11431:2002, *Building construction — Jointing products — Determination of adhesion/cohesion properties of sealants after exposure to heat, water and artificial light through glass*

ISO 11600:2002, *Building construction — Jointing products — Classification and requirements for sealants*

ISO 13640:1999, *Building construction — Jointing products — Specifications for test substrates*

CIE Publication No. 20-1972, *Recommendations for the integrated spectral irradiance and the spectral distribution of simulated solar radiation for testing purposes*

CIE Publication No. 85-1989, *Technical report — Solar spectral irradiance*, ISBN 3 900 734 22 4

3 Definitions

For the purposes of this document, the definitions given in ISO 6927 apply.

Any notation in this standard shown as 'target set value $x \pm$ operational fluctuation y ' shall be interpreted as follows: set the experimental parameter at the target value x and maintain the experimental parameter during the test procedure at $\pm y$ from the specified setting x . If the operational fluctuations exceed the maximum allowable value after the equipment has stabilized, discontinue the test and correct the cause of the problem before continuing.

4 Principle

Test specimens are prepared in which the sealant to be tested adheres to two parallel support surfaces (substrates). The specimens are conditioned statically (no movement) in a controlled climate. The conditioned specimens are then exposed to repetitive degradation cycles of artificial weathering (light, heat, and moisture) and cyclic movement under controlled environmental conditions. Within each cycle, weathering is carried out for six weeks in an artificial weathering machine. Simultaneously, with the weathering, mechanical cycling is carried out by changing the position of the extension/compression once a week. After completion of each degradation cycle (each lasting six weeks), the specimens (in their extended/compressed state) are visually examined for changes in appearance, cohesion, and adhesion of the sealant beads. The rating for quantity, width, and depth of cohesive cracks for a specific extension/compression value achieved along the length of the specimen as well as the depth, length, and range of any very significant loss of cohesion or adhesion (defined as >3 mm crack depth) is determined and the general condition of the sealant is reported. The weathering and mechanical cycling exposure and the examination for failures constitute a degradation cycle and the degradation cycle is repeated as often as desired to achieve a certain exposure.

5 Apparatus

5.1 Support

Anodized aluminium support (as shown in [Figure 1](#)) for the preparation of test specimens, consisting of two pivoting, L-shaped anodized aluminium support elements of dimensions 120 mm $\times$ 18 mm $\times$ 18 mm (length $\times$ width $\times$ height) and 2 mm thickness riveted onto an anodized aluminium base-plate of 2 mm thickness such that a cavity of dimensions 120 mm $\times$ 20 mm $\times$ 18 mm (length $\times$ width $\times$ height) is formed. Riveting of the support elements on the base-plate shall be such that they can be turned freely with minimal friction on the pivot (fulcrum). The base plate holds five equally spaced holes of 5 mm diameter (for improved ventilation of the back face of the sealant such as to ensure better cure or drying of the sealant) and two 3 mm holes for fixation of the specimen (see [Figure 1](#) and [Annex A](#)). For the specification of the anodized aluminium, refer to ISO 13640. All surfaces of the anodized aluminium support to be later in contact with the sealant shall be cleaned according to the sealant manufacturer's recommendation.

NOTE Achieving optimum adhesion on the support substrate is important in order to obtain reproducible ratings for surface and bulk degradation (cracking, crazing, cohesive failure, etc.) that is induced or influenced by mechanical cycling. Even a partial loss of adhesion will cause a section of the test specimen to be exposed to no or a lower degree of mechanical cycling than intended for a given movement amplitude of the sealant and invalidate the results obtained for this movement exposure (as assessed along the extended leg of the test specimen). Currently, no cleaning procedure and cleaning agent(s) have been identified that provide optimum adhesion on the support substrate for all sealant products. Therefore, no cleaning procedure is specified in this International Standard. If the manufacturer does not provide a recommendation for the cleaning procedure, the following method is suggested for consideration by the experimenter: Clean all surfaces of the anodized aluminium support to be later in contact with the sealant with high purity acetone (purity, by gas chromatography: 99,8 %) as follows: a) saturate a clean, lint-free paper tissue or cloth with the solvent; b) clean the substrate with the solvent-saturated cloth or tissue by wiping a minimum of three times so that visible contamination cannot be observed; c) wipe the substrate with solvent-saturated cloth or tissue and immediately afterwards dry wipe the substrate surface thoroughly using a dry, clean, lint-free paper tissue or cloth before the solvent completely evaporates. Repeat step c) at least once. In each wipe of the substrate surface during step c), a new, uncontaminated cloth or tissue should be used. For severely contaminated substrates, additional pre-cleaning steps can be required.

If other support materials are to be used, they shall be characterized and shall be described in the test report. If other support dimensions are used, they shall be described in the test report.